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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Masumi SATO, et al.

SERIAL NO: 09/903,787

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EXAMINER: BRASE, SANDRA L

FOR: COLOR IMAGE FORMING APPARATUS, AND TONER REPLENISHING APPARATUS

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

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SIR:

Applicant(s) wish to disclose the following information.

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REFERENCES

- The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.
- A check is attached in the amount required under 37 CFR §1.17(p).
- A credit card payment form is attached in the amount required under 37 CFR §1.17(p).

RELATED CASES

- Attached is a list of applicant's pending application(s) or issued patent(s) which may be related to the present application. A copy of the claims and drawings of the pending application is attached.
- A check is attached in the amount required under 37 CFR §1.17(p).
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CERTIFICATION

- Each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.
- No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.

DEPOSIT ACCOUNT

- Please charge any additional fees for the papers being filed herewith and for which no check or credit card payment is enclosed herewith, or credit any overpayment to deposit account number 15-0030. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Gregory J. Maier

Registration No. 25,599

Customer Number

22850

Tel. (703) 413-3000
Fax. (703) 413-2220
(OSMMN 05/03)Paul Sacher
Registration No. 43,418



LIST OF RELATED CASES

<u>Docket Number</u>	<u>Serial or Patent Number</u>	<u>Filing or Issue Date</u>	<u>Inventor/Applicant</u>
211432US2*	09/903,787	07/13/01	SATO et al.
239255US3	10/465,611	06/20/03	YASUI et al.

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WHAT IS CLAIMED IS:

1. A fixing device comprising:
 - a fixing belt which is driven rotationally;
 - a counter member disposed opposite to the fixing belt;
- 5 a first heater which heats the fixing belt; and
a second heater which heats the counter member, wherein the fixing belt and the counter member define a nip therebetween, through which a recording medium carrying a toner image to be fixed thereon is passed such that the toner image is directed to contact a surface of the
- 10 fixing belt, in the presence of heat and pressure applied to toner in the toner image during passage thereof to fix the toner image on the recording medium,
wherein a target temperature on the fixing belt during fixation is previously set, and first and second reference temperatures are
- 15 previously set, the first and second reference temperatures being lower than the target temperature,
a maximum allowable power is supplied to the first heater to heat the fixing belt when the temperature on the fixing belt is lower than the first reference temperature during activation of the fixing device,
- 20 the fixing belt is driven rotationally, power supplied to the first heater is decreased, and power is also supplied to the second heater when the temperature on the fixing belt reaches the first reference temperature, and
fixation is allowed to start at a point in time at which the
- 25 temperature on the fixing belt reaches the target temperature and the

temperature on the counter member reaches the second reference temperature.

2. The fixing device according to claim 1, wherein
 - 5 the target temperature is a temperature required for fixing a composite toner image formed by superimposing toner images of at least two colors on the recording medium, and
 - 10 the target temperature on the fixing belt required for fixing a monochromic toner image carried on the fixing belt is defined as a monochrome target temperature,
 - 15 wherein when a print command for forming a monochromic toner image on the recording medium is input during activation of the fixing device in which the temperature on the fixing belt is lower than the first reference temperature,
 - 20 a maximum allowable power is continuously supplied to the first heater until the temperature on the fixing belt reaches the monochrome target temperature to allow fixation to start at a point in time at which the temperature on the fixing belt reaches the monochrome target temperature.
 - 25 3. The fixing device according to claim 1, wherein the counter member comprises a counter roller which press-contacts the fixing belt and rotates, the counter roller being driven rotationally when the temperature on the fixing belt reaches the first reference temperature during activation of the fixing device.

4. The fixing device according to claim 1, wherein the fixing belt is an endless belt wound around between at least the two rollers and driven rotationally.
5. 5. The fixing device according to claim 4, wherein the first heater is disposed inside one of the rollers.
6. The fixing device according to claim 1, wherein the counter member is a counter roller which press-contacts the fixing belt to rotate, and the second heater is disposed inside the counter roller.
7. A fixing device comprising:
 - a driving roller;
 - a plurality of belt supports including the driving roller;
 - 15 a first heater;
 - an endless fixing belt wound around between the belt supports and heated by the first heater;
 - a second heater;
 - a counter member disposed opposite to one of the belt supports
 - 20 via the fixing belt and heated by the second heater; and
 - a temperature detector which detects a surface temperature on the fixing belt,
- wherein when the surface temperature on the fixing belt is lower than a predetermined temperature during activation of the device, a first power is supplied to the first heater, and

when the surface temperature on the fixing belt reaches the predetermined temperature, a second power is supplied to heat the second heater, at least the fixing belt is driven rotationally, and the power supplied to the first heater is dropped to an amount equal to an 5 amount obtained by subtracting the second power from the first power.

8. The fixing device according to claim 7, wherein a time for driving the fixing belt rotationally is a predetermined time.

10 9. The fixing device according to claim 7, wherein a time for driving the fixing belt rotationally is set based on the surface temperature on the fixing belt detected during activation.

10. The fixing device according to claim 7, wherein a time for driving 15 the fixing belt rotationally is set based on the surface temperature on the counter member detected during activation of the fixing device.

11. The fixing device according to claim 7, wherein the fixing belt is an endless belt wound around between at least the two rollers and 20 driven rotationally.

12. The fixing device according to claim 11, wherein the first heater is disposed inside one of the rollers.

13. The fixing device according to claim 7, wherein the counter member is a counter roller which press-contacts the fixing belt to rotate, and the second heater is disposed inside the counter roller.

5 14. A fixing device comprising:
at least two belt supports;
a fixing belt wound around between at least the two belt supports;
a counter member disposed opposite to one of the belt supports
10 via the fixing belt;
a first heater which heats the fixing belt;
a second heater which heats the counter member;
a temperature detector which detects a temperature on the fixing belt, wherein the fixing belt and the counter member define a nip
15 therebetween, through which a recording medium is passed to fix an image on the recording medium; and
a power controller which varies a ratio of power supplied to the second heater to power to the first heater based on the temperature detected by the temperature detector.

20
15. The fixing device according to claim 14, wherein the power controller varies the ratio during activation of the fixing device.

16. The fixing device according to claim 14, wherein the power controller increases the ratio of the power supplied to the second heater to the power to the first heater in either of a case where the detected temperature exceeds a predetermined temperature and a case where 5 the detected time exceeds a predetermined time.
17. The fixing device according to claim 14, wherein the fixing belt is driven rotationally in either of a case where the detected temperature exceeds a predetermined temperature and a case where the detected 10 time exceeds a predetermined time during activation of the fixing device.
18. The fixing device according to claim 14, wherein the fixing belt is an endless belt wound around between at least the two rollers and 15 driven rotationally.
19. The fixing device according to claim 18, wherein the first heater is disposed inside one of the rollers.
20. The fixing device according to claim 14, wherein the counter member is a counter roller which press-contacts the fixing belt to rotate, and the second heater is disposed inside the counter roller.

21. A fixing device comprising:

at least two belt supports;

a fixing belt wound around between at least the two belt supports;

5 a counter member disposed opposite to one of the belt supports

via the fixing belt;

a first heater which heats the fixing belt;

a second heater which heats the counter member, wherein the fixing belt and the counter member define a nip therebetween, through

10 which a recording medium is passed to fix an image on the recording medium;

a time detector which detects a time of supplying power to at least one of the first and the second heaters; and

15 a power controller which varies a ratio of power supplied to the second heater to power to the first heater based on the time detected by the time detector.

22. The fixing device according to claim 21, wherein the power controller varies the ratio during activation of the fixing device.

20

23. The fixing device according to claim 21, wherein the power controller increases the ratio of the power supplied to the second heater to the power to the first heater in either of a case where the detected temperature exceeds a predetermined temperature and a case where 25 the detected time exceeds a predetermined time.

24. The fixing device according to claim 21, wherein the fixing belt is driven rotationally in either of a case where the detected temperature exceeds a predetermined temperature and a case where the detected time exceeds a predetermined time during activation of the fixing device.

25. The fixing device according to claim 21, wherein the fixing belt is an endless belt wound around between at least the two rollers and driven rotationally.

10 26. The fixing device according to claim 25, wherein the first heater is disposed inside one of the rollers.

27. The fixing device according to claim 21, wherein the counter member is a counter roller which press-contacts the fixing belt to rotate, and the second heater is disposed inside the counter roller.

15 28. An image forming apparatus comprising:
a fixing device including
20 a fixing belt which is driven rotationally;
a counter member disposed opposite to the fixing belt;
a first heater which heats the fixing belt; and
a second heater which heats the counter member,
wherein the fixing belt and the counter member define a nip
25 therebetween, through which a recording medium carrying a toner

image to be fixed thereon is passed such that the toner image is directed to contact a surface of the fixing belt, in the presence of heat and pressure applied to toner in the toner image during passage thereof to fix the toner image on the recording medium,

5 wherein a target temperature on the fixing belt during fixation and first and second reference temperatures are previously set, first and second reference temperatures being lower than the target temperature,

10 a maximum allowable power is supplied to the first heater to heat the fixing belt when the temperature on the fixing belt is lower than the first reference temperature during activation of the fixing device,

15 the fixing belt is driven rotationally, power supplied to the first heater is decreased, and power is also supplied to the second heater when the temperature on the fixing belt reaches the first reference temperature, and

20 fixation is allowed to start at a point in time at which the temperature on the fixing belt reaches the target temperature and the temperature on the counter member reaches the second reference temperature.

29. An image forming apparatus comprising:

 a fixing device including

 a driving roller;

25 a plurality of belt supports including the driving roller;

a first heater;

an endless fixing belt wound around between the belt

supports and heated by the first heater;

a second heater;

5 a counter member disposed opposite to one of the belt

supports via the fixing belt and heated by the second heater; and

a temperature detector which detects a surface

temperature on the fixing belt,

wherein when the surface temperature on the fixing belt

10 is lower than a predetermined temperature during activation of the

device, a first power is supplied to the first heater, and

when the surface temperature on the fixing belt reaches the predetermined temperature, a second power is supplied to heat the second heater, at least the fixing belt is driven rotationally, and the

15 power supplied to the first heater is dropped to an amount equal to an amount obtained by subtracting the second power from the first power

30. An image forming apparatus comprising:

a fixing device including

20 at least two belt supports;

a fixing belt wound around between at least the two belt

supports;

a counter member disposed opposite to one of the belt

supports via the fixing belt;

25 a first heater which heats the fixing belt;

10 a second heater which heats the counter member;
15 a temperature detector which detects a temperature on
the fixing belt, wherein the fixing belt and the counter member define a
nip therebetween, through which a recording medium is passed to fix an
image on the recording medium; and
20 a power controller which varies a ratio of power supplied
to the second heater to power to the first heater based on the
temperature detected by the temperature detector.

25 31. An image forming apparatus comprising:
30 a fixing device including
35 at least two belt supports;
40 a fixing belt wound around between at least the two belt
supports;
45 a counter member disposed opposite to one of the belt
supports via the fixing belt;
50 a first heater which heats the fixing belt;
55 a second heater which heats the counter member,
60 wherein the fixing belt and the counter member define a nip
65 therebetween, through which a recording medium is passed to fix an
image on the recording medium;
70 a time detector which detects a time of supplying power
75 to at least one of the first and the second heaters; and
80 a power controller which varies a ratio of power supplied
85 to the second heater to power to the first heater based on the time

detected by the time detector.

ABSTRACT OF THE DISCLOSURE

A fixing device includes a fixing belt, a first heater, a second heater, a supporting roller, and a counter roller. During activation of the fixing device, a maximum power is supplied to the first heater, and

5 only the first heater heats the fixing belt. When a temperature on the fixing belt reaches a first reference temperature, the fixing belt is driven rotationally, the power supplied to the first heater is dropped, and power is supplied also to the second heater. When the temperature on the

10 fixing belt reaches a target temperature and the temperature on the counter roller reaches a second reference temperature, fixing operation is allowed to start.

FIG.1

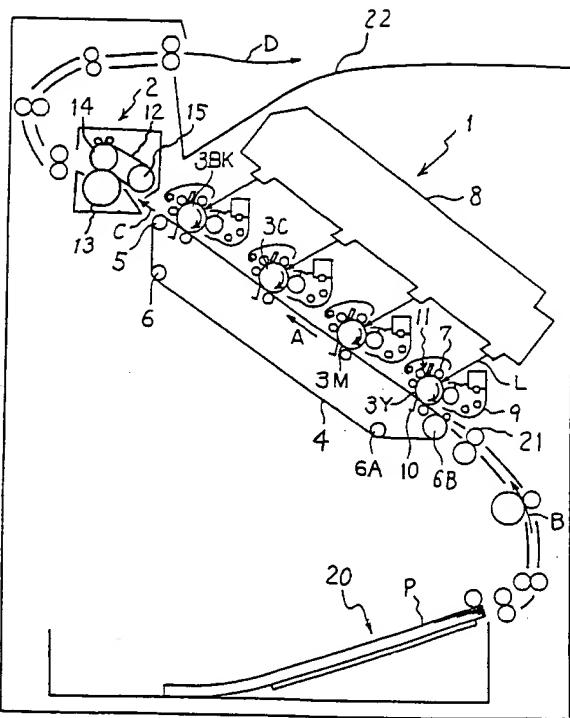


FIG.3

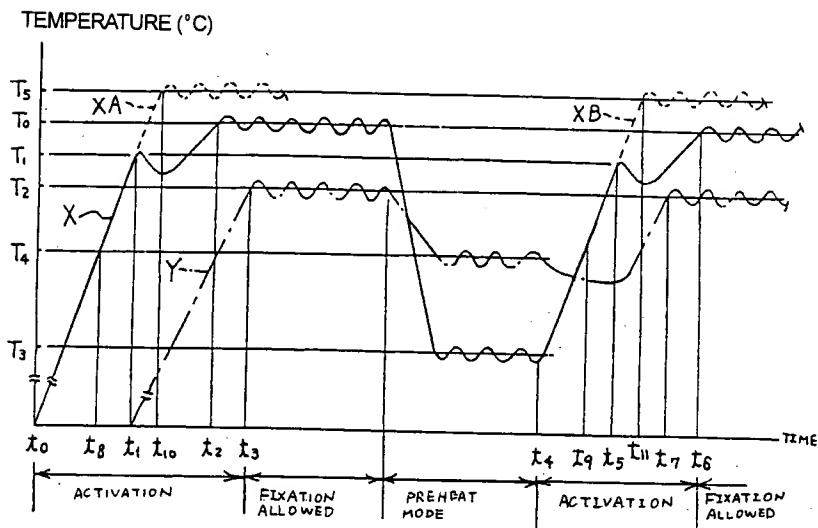


FIG.4

